

Cisco ONS Family Optical Pluggable Modules

This document provides Technical Descriptions, Applications, and compatibility information for the Gigabit Interface Converter (GBIC), Small Form-Factor Pluggable (SFP), and 10 Gigabit Small Form-Factor Pluggable (XFP) optics modules in the Cisco ONS product family.

Summary

Cisco® offers a comprehensive range of pluggable optical modules for the Cisco ONS Family of multiservice platforms. The wide variety of modules gives you flexible and cost-effective options for all types of client interfaces. Cisco offers a range of GBICs for Gigabit Ethernet use, a wide variety of SFP modules, and has recently introduced 10-Gbps Small Form-Factor Pluggable (XFP) modules. These small, modular optical interface transceivers offer a convenient and cost-effective solution for an array of applications in the data center, campus, metropolitan-area access and ring network, storage area network, and long-haul network.

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Technical Overview

SFP Module

The SFP transceiver module (Figure 1) is a bidirectional device with a transmitter and receiver in the same physical package. The module interfaces to the network through a connector interface on the electrical ports and through an LC termination connector on the optical ports. Electrical interfaces and dimensions are defined in the SFF-8472 industry-standard multisource agreement (MSA).

Figure 1. SFP Transceiver Modules for the Cisco ONS Family



A schematic of the SFP transceiver module functional block diagram is illustrated in Figure 2. It contains three parts: the transmitter, receiver, and Electrically Erasable Programmable Read-Only Memory (EEPROM) storage chip. This block diagram is intended for information purposes only and does not illustrate design requirements.

Transmitter

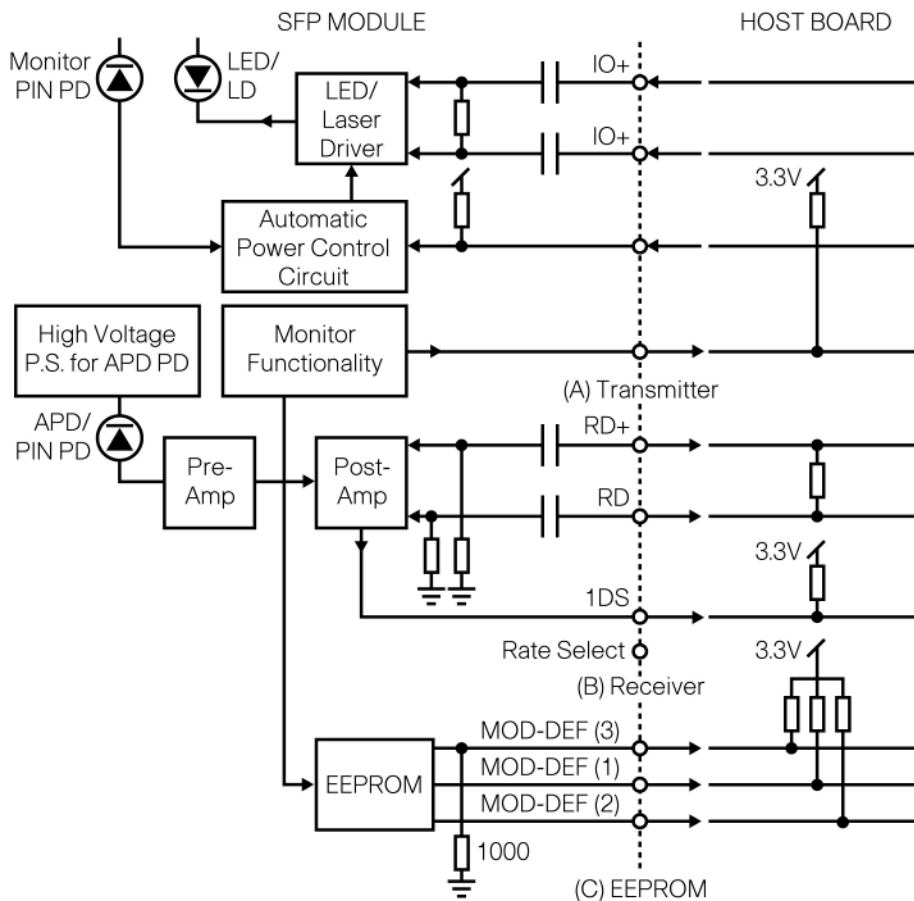
In the transmit direction, the SFP transceiver module receives the electrical signal and transmits this data in an optical signal by using a laser driver that controls the laser diode. The optical output power is held constant by an automatic power control circuit.

Receiver

In the receive direction, the SFP transceiver module receives an NRZ optical signal and converts it to an electrical equivalent. The receive portion of the module will use some kind of amplifier to control the converted electrical signal.

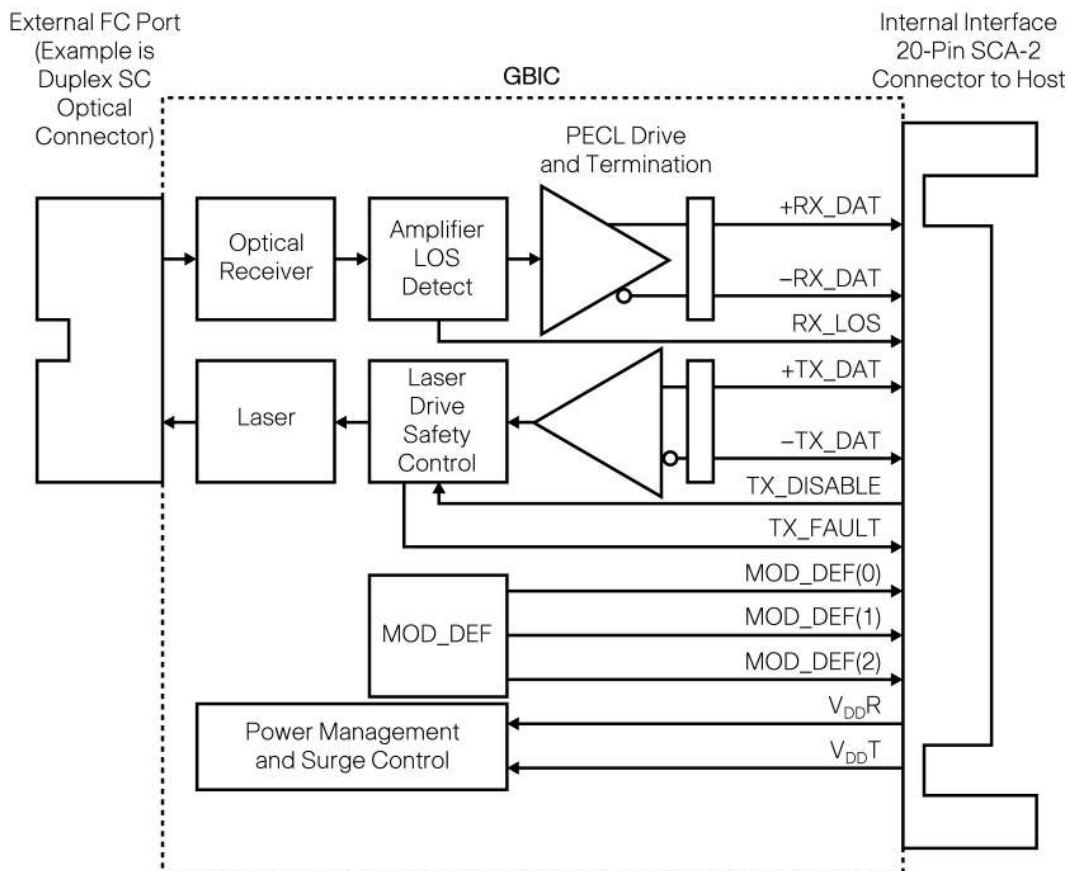
EEPROM

This type of SFP transceiver is identified by the standard two-wire serial interface used in EEPROM with an I2C interface (with serial ID functions) that is part of the GBIC specifications and the SFF-8472 MSA. In addition, EEPROM offers an enhanced monitoring interface for optical transceivers as described in SFF-8472, which allows real-time access to the device to enable monitoring of received optical power, laser bias current, laser optical output power, etc.

Figure 2. SFP Module Block Diagram**GBIC Module**

The GBIC transceiver module (Figure 3) is a bidirectional device with a transmitter and receiver in the same physical package. This transceiver converts serial electric signals to serial optical signals and vice versa. In networking, a GBIC is used to interface a fiber optic system with an Ethernet system, such as Fibre Channel and Gigabit Ethernet.

Figure 3. GBIC Transceiver Modules for the Cisco ONS Family

Figure 4. Functional Diagram of Typical Shortwave Laser GBIC**XFP Module**

The XFP transceiver module (Figure 5) is a bidirectional device with a transmitter and receiver in the same physical package. The XFP module contains a 30-pin surface mount connector on the electrical interface and a duplex LC connector on the optical interface.

Figure 5. XFP Transceiver Module for the Cisco ONS Family

Figure 6 shows an XFP transceiver module functional block diagram. It contains two parts: the transmitter and the receiver.

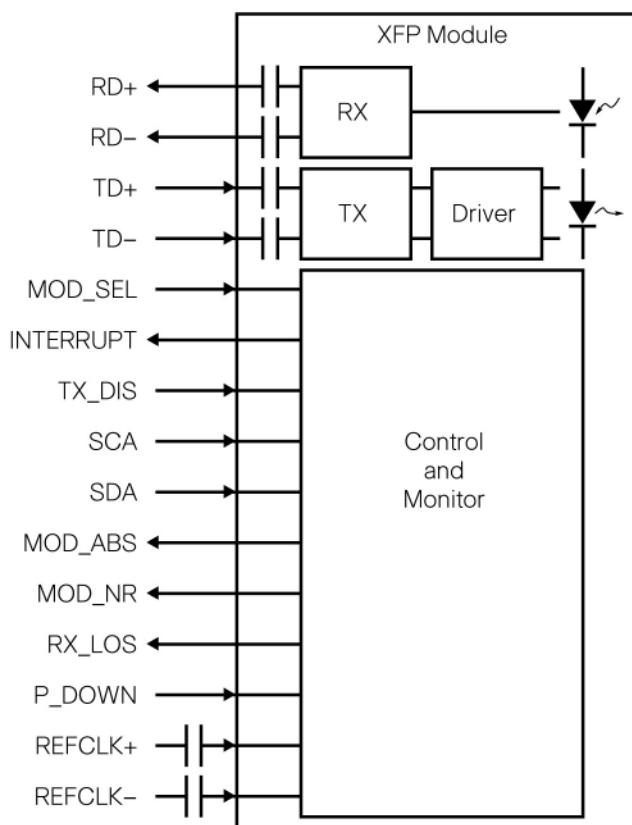
Transmitter

In the transmit direction, the transceiver module receives a 10-Gbps electrical data signal and transmits the data as an optical signal via an E/O converter. The optical output power is held constant by an automatic power control circuit. The transmitter also contains a Clock Data Recovery (CDR) circuit. The function of this circuit is to attenuate and reshape any jitter received on the electrical interface.

Receiver

In the receive direction, the transceiver module receives a 10-Gbps optical signal and converts it to an electrical equivalent. The receiver contains a CDR circuit.

Figure 6. XFP Module Block Diagram



Pluggable Modules: List and Description

Cisco ONS Family modules have well-defined product IDs, making it easy for you to order the appropriate module.

The product ID is structured as follows: ONS-"AB"-"CCC"-"DD".

- **A** = S for SFP, G for GBIC, and X for XFP
- **B** = C for commercial temperature (0 to 70°C), E for extended temperature (–10 to 85°C), and I for industrial temperature (–40 to 85°C)
- **CCC** = Supported bit-rate or signal type: 155 Mbps for OC-12/STM-1 signal or 2 GF for a tri-rate Gigabit Ethernet, Fibre Channel, and 2G Fibre Channel signal support
- **DD** = Supported reach: S1 for short-reach/intra-office 1310 nm interface or SX for Ethernet

There are still some older product IDs for the Cisco ONS 15454 platform, but those IDs will migrate toward the newer ID scheme for the Cisco ONS Family.

Red Color codes indicate deltas introduced with the 8.5.x release.

SONET/SDH SFP Modules

Cisco offers a wide range of different SFP modules that are fully compliant with SONET and SDH standards. Table 1 provides details.

Table 1. SONET/SDH SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-2G-S1=	SFP – OC48/STM16 – 1310 SR – SM LC	10-2017-01	GR253 OC48 SR G.957 I-16	–10 to +85
ONS-SE-2G-L2=	OC48/STM16, LR2, 1550nm, SFP, EXT	10-2013-01	GR253 OC48 LR2 G.957 L-16.2	–10 to +85
ONS-SI-155-SR-MM=	SFP – OC3, SR, 1310 NM, MULTI MODE, I-TEMP	10-2279-01	GR253	–40 to +85
ONS-SI-155-I1=	SFP – OC3/STM1 IR1/S-1.1 1310 SFP, ITEMP	10-1938-02	GR253 OC3 IR1 G.957 S-1.1	–40 to +85
ONS-SI-155-L1=	SFP – OC3/STM1 LR, L-1.1, 1310 nm, ITEMP	10-1957-02	GR253 OC3 LR1 G.957 L-1.1	–40 to +85
ONS-SI-155-L2=	SFP – OC3/STM1 LR-2, L-1.2, 1550 nm, ITEMP	10-1937-02	GR253 OC3 LR2 G.957 L-1.2	–40 to +85
ONS-SI-622-SR-MM=	SFP – OC12, SR, 1310 NM, MULTI MODE, I-TEMP	10-2280-01	GR253	–40 to +85
ONS-SI-622-I1=	SFP – OC12/STM4 and OC3/STM1 IR, S-4.1, S-1.1, 1310 nm, ITEMP	10-1956-02	GR253 OC3/OC12 IR1 G.957 S-4.1/S-1.1	–40 to +85
ONS-SI-622-L1=	SFP – OC12/STM4 LR, L-4.1, 1310 nm, ITEMP	10-1958-02	GR253 OC12 LR1 G.957 L-4.1	–40 to +85
ONS-SI-622-L2=	SFP – OC12/STM4 LR, L-4.2, 1550 nm, ITEMP	10-1936-02	GR253 OC12 LR2 G.957 L-4.2	–40 to +85
ONS-SI-2G-S1	SFP – OC48/STM16, SR, 1310 nm, ITEMP, LC	10-1992-02	GR253 OC48 SR G.957 I-16	–40 to +85
ONS-SI-2G-I1=	SFP – OC48/STM16, IR, 1310 nm, ITEMP, LC	10-1993-02	GR253 OC48 IR1 G.957 S-16.1	–40 to +85
ONS-SI-2G-L1=	SFP – OC48/STM16, LR1, 1310 nm, ITEMP, LC	10-2102-02	GR253 OC48 LR1 G.957 L-16.1	–40 to +85
ONS-SI-2G-L2=	SFP – OC48/STM16, LR2, 1550 nm, ITEMP, LC	10-1990-02	GR253 OC48 LR2 G.957 L-16.2	–40 to +85

Data SFP Modules

Cisco offers a wide range of different data SFP modules able to transmit Gigabit Ethernet, Fibre channel, FICON, and ESCON signal format. Table 2 provides details.

Table 2. Data SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-100-LX10=	SFP – 100 Mbps Long Reach – 1310 nm – SM – LC, EXT-TEMP	10-2213-01	100Base LX IEEE-802.3	–10 to +85
ONS-SI-100-LX10=	SFP – 100 Mbps Long Reach – 1310 nm – SM – LC, ITEMP	10-2294-01	100Base LX IEEE-802.3	–40 to +85

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-100-FX=	SFP – 100 Mbps Short Reach – 1310 nm – MM – LC, EXT-TEMP	10-2212-01	100Base FX IEEE-802.3	–10 to +85
ONS-SI-100-FX=	SFP – 100 Mbps Short Reach – 1310 nm – MM – LC, ITEMP	10-2350-01	100Base FX IEEE-802.3	–40 to +85
ONS-SE-100-BX10U=	SFP -10/100 BX-U, EXT	10-2353-01	100Base BX-U IEEE-802.3	–10 to +85
ONS-SE-100-BX10D=	SFP -10/100 BX-D, EXT	10-2352-01	100Base BX-D IEEE-802.3	–10 to +85
15327-SFP-LC-SX=	1000 Base SX LC, SFP	30-1301-01	1000Base SX IEEE-802.3	0 to +70
15327-SFP-LC-LX=	1000 Base LX LC, SFP	30-1299-01	1000Base SX IEEE-802.3	0 to +70
15454-SFP-LC-SX=	1000 Base SX LC, SFP	30-1301-01	1000Base SX IEEE-802.3	0 to +70
15454-SFP-LC-LX=	1000 Base LX LC, SFP	30-1299-01	1000Base LX IEEE-802.3	0 to +70
ONS-SC-GE-SX= ¹	1000Base SX SFP – 850nm – LC – C Temp	10-2301-01	1000Base SX IEEE-802.3	0 to +70
ONS-SI-GE-SX=	SFP – 1000BASE-SX Gigabit Ethernet, 850nm, MM, I-TEMP	10-2295-01	1000Base SX IEEE-802.3	–40 to +85
ONS-SC-GE-LX= ²	1000Base LX SFP – 1310nm – LC – C Temp	10-2298-01	1000Base LX IEEE-802.3	0 to +70
ONS-SI-GE-LX=	SFP – 1000BASE-LX Gigabit Ethernet, 1310, SM, I-TEMP	10-2300-01	1000Base SX IEEE-802.3	–40 to +85
15454-SFP-GE+-LX= EOS	SFP – GE/1G-FC/2G-FC – 1310nm – MM – LC	10-1832-03	1000Base LX IEEE-802.3, 100-M5-SN-I 200-M5-SN-I	–10 to +85
15454-SFP-GEFC-SX= EOS	SFP – GE/1G-FC/2G-FC – 850nm – MM – LC	10-1833-02	1000Base SX IEEE-802.3, 100-M5-SN-I 100-M6-SN-I 200-M5-SN-I 200-M6-SN-I	–10 to +85
ONS-SE-G2F-SX=	SFP – GE/1G-FC/2G-FC – 850 nm – MM – LC – EXT TEMP	10-2272-01	1000Base SX IEEE-802.3, 100-M5-SN-I 100-M6-SN-I 200-M5-SN-I 200-M6-SN-I	–10 to +85
ONS-SE-G2F-LX=	SFP – GE/1G-FC/2G-FC/HDTV – 1310 nm – SM – LC – EXT TEMP	10-2273-02	1000Base LX IEEE-802.3, 100-SM-LC-L 200-SM-LC-L	–10 to +85
ONS-SI-GE-ZX=	SFP – 1000BASE-ZX Gigabit Ethernet, 1550, SM, I-Temp	10-2296-01	1000Base ZX IEEE-802.3	–40 to +85
ONS-SE-GE-ZX=	SFP – 1000BASE-ZX Gigabit Ethernet, 1550, SM, Ext-Temp	10-2354-01	1000Base ZX IEEE-802.3	–10 to +85
15454-SFP-200=	SFP-ESCON – 1310 nm – MM – LC	10-1750-01	ESCON	0 to +70
ONS-SE-200-MM=	SFP-ESCON – 1310 nm – MM – LC – EXT TEMP	10-2248-01	ESCON	–10 to +85
ONS-SE-4G-MM=	4G FC SFP, 850 nm, LC, MM – EXT TEMP	10-2259-01	400-M5-SN-I and 400-M6-SN-I	–10 to +85

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-4G-SM=	4G FC SFP, 1310 nm, LC, SM – EXT TEMP	10-2252-01	400-SM-LC-L	–10 to +85

- 1: This SFP module will replace the old 15327-SFP-LC-SX= and 15454-SFP-LC-SX= that have begun the end-of-life process.
 2: This SFP module will replace the old 15327-SFP-LC-LX= and 15454-SFP-LC-LX= that have begun the end-of-life process.

Electrical SFP Modules

Cisco also offers electrical SFP modules for the Cisco ONS 15600 Series platform. Table 3 shows the details.

Table 3. Electrical SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-ZE-EL=	SFP – 10/100/1000 Ethernet BaseT Multirate Copper RJ-45	10-2351-01	IEEE-802.3	–10 to +85
ONS-SC-155-EL=	SFP – STM1 Electrical	10-2363-01	ITU-T G.703 (ES1)	0 to +70

Multirate SFP Modules

Cisco also offers multirate SFP modules for the Cisco ONS 15600 Series platforms. Table 4 provides details.

Table 4. Multirate SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-Z1=	SFP-OC48IR1,12/3SR1,GE LX STM S-16.1,I-4,I-1,1310nm EXT-TEMP	10-1971-02	1000Base LX IEEE-802.3, GR253 OC48 IR1 OC12 SR ,OC3 SR G.957 S-16.1, I-4.1,I-1.1	–10 to +85

DWDM SFP Modules

Cisco offers a wide range of DWDM ITU-T compliant SFP modules. Table 5 lists details.

Table 5. DWDM SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SC-2G-28.7=	OC-48/STM-16, SFP, 1528.77, 100 GHz, LC	10-2307-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-30.3=	OC-48/STM-16, SFP, 1530.33, 100 GHz, LC	10-2155-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-31.1=	OC-48/STM-16, SFP, 1531.12, 100 GHz, LC	10-2156-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-31.9=	OC-48/STM-16, SFP, 1531.90, 100 GHz, LC	10-2157-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-32.6=	OC-48/STM-16, SFP, 1532.68, 100 GHz, LC	10-2158-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-33.4=	OC-48/STM-16, SFP, 1533.47, 100 GHz, LC	10-2306-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-34.2=	OC-48/STM-16, SFP, 1534.25, 100 GHz, LC	10-2159-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-35.0=	OC-48/STM-16, SFP, 1535.04, 100 GHz, LC	10-2160-02	ITU G694, GR2918	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SC-2G-35.8=	OC-48/STM-16, SFP, 1535.82, 100 GHz, LC	10-2161-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-36.6=	OC-48/STM-16, SFP, 1536.61, 100 GHz, LC	10-2162-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-38.1=	OC-48/STM-16, SFP, 1538.19, 100 GHz, LC	10-2163-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-38.9=	OC-48/STM-16, SFP, 1538.98, 100 GHz, LC	10-2164-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-39.7=	OC-48/STM-16, SFP, 1539.77, 100 GHz, LC	10-2165-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-40.5=	OC-48/STM-16, SFP, 1540.56, 100 GHz, LC	10-2185-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-41.3=	OC-48/STM-16, SFP, 1541.35, 100 GHz, LC	10-2305-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-42.1=	OC-48/STM-16, SFP, 1542.14, 100 GHz, LC	10-2166-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-42.9=	OC-48/STM-16, SFP, 1542.94, 100 GHz, LC	10-2167-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-43.7=	OC-48/STM-16, SFP, 1543.73, 100 GHz, LC	10-2168-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-44.5=	OC-48/STM-16, SFP, 1544.53, 100 GHz, LC	10-2169-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-46.1=	OC-48/STM-16, SFP, 1546.12, 100 GHz, LC	10-2170-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-46.9=	OC-48/STM-16, SFP, 1546.92, 100 GHz, LC	10-2171-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-47.7=	OC-48/STM-16, SFP, 1547.72, 100 GHz, LC	10-2172-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-48.5=	OC-48/STM-16, SFP, 1548.51, 100 GHz, LC	10-2173-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-49.3=	OC-48/STM-16, SFP, 1549.32, 100 GHz, LC	10-2304-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-50.1=	OC-48/STM-16, SFP, 1550.12, 100 GHz, LC	10-2186-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-50.9=	OC-48/STM-16, SFP, 1550.92, 100 GHz, LC	10-2174-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-51.7=	OC-48/STM-16, SFP, 1551.72, 100 GHz, LC	10-2175-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-52.5=	OC-48/STM-16, SFP, 1552.52, 100 GHz, LC	10-2176-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-54.1=	OC-48/STM-16, SFP, 1554.13, 100 GHz, LC	10-2177-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-54.9=	OC-48/STM-16, SFP, 1554.94, 100 GHz, LC	10-2178-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-55.7=	OC-48/STM-16, SFP, 1555.75, 100 GHz, LC	10-2179-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-56.5=	OC-48/STM-16, SFP, 1556.55, 100 GHz, LC	10-2180-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-57.3=	OC-48/STM-16, SFP, 1557.36, 100 GHz, LC	10-2308-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-58.1=	OC-48/STM-16, SFP, 1558.17, 100 GHz, LC	10-2181-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-58.9=	OC-48/STM-16, SFP, 1558.98, 100 GHz, LC	10-2182-02	ITU G694, GR2918	0 to +70
ONS-SC-2G-59.7=	OC-48/STM-16, SFP, 1559.79, 100 GHz, LC	10-2183-02	ITU G694, GR2918	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SC-2G-60.6=	OC-48/STM-16, SFP, 1560.61, 100 GHz, LC	10-2184-02	ITU G694, GR2918	0 to +70

CWDM SFP Modules

Cisco offers a wide range of CWDM ITU-T compliant SFP modules. Table 6 lists the details.

Table 6. CWDM SFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SE-155-1470=	SFP – OC-3/STM-1, CWDM, 1470 nm, EXT	10-1996-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1490=	SFP – OC-3/STM-1, CWDM, 1490 nm, EXT	10-1998-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1510=	SFP – OC-3/STM-1, CWDM, 1510 nm, EXT	10-1999-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1530=	SFP – OC-3/STM-1, CWDM, 1530 nm, EXT	10-2000-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1550=	SFP – OC-3/STM-1, CWDM, 1550 nm, EXT	10-2001-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1570=	SFP – OC-3/STM-1, CWDM, 1570 nm, EXT	10-2002-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1590=	SFP – OC-3/STM-1, CWDM, 1590 nm, EXT	10-2003-01	ITU-T G.694.2	–10 to +85
ONS-SE-155-1610=	SFP – OC-3/STM-1, CWDM, 1610 nm, EXT	10-1997-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1470=	SFP – OC-12/STM-4, CWDM, 1470 nm, EXT	10-2004-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1490=	SFP – OC-12/STM-4, CWDM, 1490 nm, EXT	10-2005-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1510=	SFP – OC-12/STM-4, CWDM, 1510 nm, EXT	10-2006-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1530=	SFP – OC-12/STM-4, CWDM, 1530 nm, EXT	10-2007-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1550=	SFP – OC-12/STM-4, CWDM, 1550 nm, EXT	10-2008-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1570=	SFP – OC-12/STM-4, CWDM, 1570 nm, EXT	10-2009-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1590=	SFP – OC-12/STM-4, CWDM, 1590 nm, EXT	10-2010-01	ITU-T G.694.2	–10 to +85
ONS-SE-622-1610=	SFP – OC-12/STM-4, CWDM, 1610 nm, EXT	10-2011-01	ITU-T G.694.2	–10 to +85
ONS-SC-Z3-1470=	SFP – OC-48/STM-16/GE, CWDM, 1470 nm	10-2285-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1490=	SFP – OC-48/STM-16/GE, CWDM, 1490 nm	10-2286-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1510=	SFP – OC-48/STM-16/GE, CWDM, 1510 nm	10-2287-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1530=	SFP – OC-48/STM-16/GE, CWDM, 1530 nm	10-2288-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1550=	SFP – OC-48/STM-16/GE, CWDM, 1550 nm	10-2289-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1570=	SFP – OC-48/STM-16/GE, CWDM, 1570 nm	10-2290-01	ITU-T G.694.2	0 to +70
ONS-SC-Z3-1590=	SFP – OC-48/STM-16/GE, CWDM, 1590 nm	10-2291-01	ITU-T G.694.2	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-SC-Z3-1610=	SFP – OC-48/STM-16/GE, CWDM, 1610 nm	10-2292-01	ITU-T G.694.2	0 to +70

GBIC List and Descriptions

Grey GBICs

Cisco offers a wide range of Grey GBICs. Table 7 provides the details.

Table 7. Grey GBICs

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-GC-GE-LX=	1000Base-LX, SC, SM or MM	10-2191-01	1000Base-SX IEEE-802.3	0 to +70
ONS-GC-GE-SX=	1000Base-SX, SC, MM	10-2192-01	1000Base-LX IEEE-802.3	0 to +70
ONS-GC-GE-ZX=	1000Base-ZX, SM	10-2190-01	1000Base-ZX IEEE-802.3	0 to +70
ONS-GX-2FC-MMI=	1 Gbps or 2 Gbps, 850 nm, SC, MM	10-2015-01	100-M5-SN-I, 100-M6-SN-I, 200-M5-SN-I, 200-M6-SN-I	-10 to +85
ONS-GX-2FC-SML=	1 Gbps or 2 Gbps, 1310 nm, SC, SM	10-2016-01	100-SM-LC-L 200-SM-LC-L	-10 to +85

CWDM GBICs

Cisco offers a complete set of CWDM GBICs. Table 8 lists details.

Table 8. CWDM GBICs

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
15454-GBIC-1470=	1000BASE-CWDM 1470 nm GBIC (single mode only)	10-1453-01	ITU-T G.694.2	0 to +70
15454-GBIC-1490=	1000BASE-CWDM 1490 nm GBIC (single mode only)	10-1454-01	ITU-T G.694.2	0 to +70
15454-GBIC-1510=	1000BASE-CWDM 1510 nm GBIC (single mode only)	10-1455-01	ITU-T G.694.2	0 to +70
15454-GBIC-1530=	1000BASE-CWDM 1530 nm GBIC (single mode only)	10-1456-01	ITU-T G.694.2	0 to +70
15454-GBIC-1550=	1000BASE-CWDM 1550 nm GBIC (single mode only)	10-1457-01	ITU-T G.694.2	0 to +70
15454-GBIC-1570=	1000BASE-CWDM 1570 nm GBIC (single mode only)	10-1458-01	ITU-T G.694.2	0 to +70
15454-GBIC-1590=	1000BASE-CWDM 1590 nm GBIC (single mode only)	10-1459-01	ITU-T G.694.2	0 to +70
15454-GBIC-1610=	1000BASE-CWDM 1610 nm GBIC (single mode only)	10-1460-01	ITU-T G.694.2	0 to +70

DWDM GBICs

Cisco offers a complete set of DWDM GBICs. Table 9 lists the details.

Table 9. DWDM GBICs

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
15454-GBIC-30.3=	1000BASE-DWDM 1530.33 nm GBIC	10-1845-01	ITU G694, GR2918	0 to +70
15454-GBIC-31.1=	1000BASE-DWDM 1531.12 nm GBIC	10-1846-01	ITU G694, GR2918	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
15454-GBIC-31.9=	1000BASE-DWDM 1531.90 nm GBIC	10-1847-01	ITU G694, GR2918	0 to +70
15454-GBIC-32.6=	1000BASE-DWDM 1532.68 nm GBIC	10-1848-01	ITU G694, GR2918	0 to +70
15454-GBIC-34.2=	1000BASE-DWDM 1534.25 nm GBIC	10-1849-01	ITU G694, GR2918	0 to +70
15454-GBIC-35.0=	1000BASE-DWDM 1535.04 nm GBIC	10-1850-01	ITU G694, GR2918	0 to +70
15454-GBIC-35.8=	1000BASE-DWDM 1535.82 nm GBIC	10-1851-01	ITU G694, GR2918	0 to +70
15454-GBIC-36.6=	1000BASE-DWDM 1536.61 nm GBIC	10-1852-01	ITU G694, GR2918	0 to +70
15454-GBIC-38.1=	1000BASE-DWDM 1538.19 nm GBIC	10-1853-01	ITU G694, GR2918	0 to +70
15454-GBIC-38.9=	1000BASE-DWDM 1538.98 nm GBIC	10-1854-01	ITU G694, GR2918	0 to +70
15454-GBIC-39.7=	1000BASE-DWDM 1539.77 nm GBIC	10-1855-01	ITU G694, GR2918	0 to +70
15454-GBIC-40.5=	1000BASE-DWDM 1540.56 nm GBIC	10-1856-01	ITU G694, GR2918	0 to +70
15454-GBIC-42.1=	1000BASE-DWDM 1542.14 nm GBIC	10-1857-01	ITU G694, GR2918	0 to +70
15454-GBIC-42.9=	1000BASE-DWDM 1542.94 nm GBIC	10-1858-01	ITU G694, GR2918	0 to +70
15454-GBIC-43.7=	1000BASE-DWDM 1543.73 nm GBIC	10-1859-01	ITU G694, GR2918	0 to +70
15454-GBIC-44.5=	1000BASE-DWDM 1544.53 nm GBIC	10-1860-01	ITU G694, GR2918	0 to +70
15454-GBIC-46.1=	1000BASE-DWDM 1546.12 nm GBIC	10-1861-01	ITU G694, GR2918	0 to +70
15454-GBIC-46.9=	1000BASE-DWDM 1546.92 nm GBIC	10-1862-01	ITU G694, GR2918	0 to +70
15454-GBIC-47.7=	1000BASE-DWDM 1547.72 nm GBIC	10-1863-01	ITU G694, GR2918	0 to +70
15454-GBIC-48.5=	1000BASE-DWDM 1548.51 nm GBIC	10-1864-01	ITU G694, GR2918	0 to +70
15454-GBIC-50.1=	1000BASE-DWDM 1550.12 nm GBIC	10-1865-01	ITU G694, GR2918	0 to +70
15454-GBIC-50.9=	1000BASE-DWDM 1550.92 nm GBIC	10-1866-01	ITU G694, GR2918	0 to +70
15454-GBIC-51.7=	1000BASE-DWDM 1551.72 nm GBIC	10-1867-01	ITU G694, GR2918	0 to +70
15454-GBIC-52.5=	1000BASE-DWDM 1552.52 nm GBIC	10-1868-01	ITU G694, GR2918	0 to +70
15454-GBIC-54.1=	1000BASE-DWDM 1554.13 nm GBIC	10-1869-01	ITU G694, GR2918	0 to +70
15454-GBIC-54.9=	1000BASE-DWDM 1554.94 nm GBIC	10-1870-01	ITU G694, GR2918	0 to +70
15454-GBIC-55.7=	1000BASE-DWDM 1555.75 nm GBIC	10-1871-01	ITU G694, GR2918	0 to +70
15454-GBIC-56.5=	1000BASE-DWDM 1556.55 nm GBIC	10-1872-01	ITU G694, GR2918	0 to +70
15454-GBIC-58.1=	1000BASE-DWDM 1558.17 nm GBIC	10-1873-01	ITU G694, GR2918	0 to +70
15454-GBIC-58.9=	1000BASE-DWDM 1558.98 nm GBIC	10-1874-01	ITU G694, GR2918	0 to +70
15454-GBIC-59.7=	1000BASE-DWDM 1559.79 nm GBIC	10-1875-01	ITU G694, GR2918	0 to +70
15454-GBIC-60.6=	1000BASE-DWDM 1560.61 nm GBIC	10-1876-01	ITU G694, GR2918	0 to +70

XFP List and Description

Grey XFP Modules

Cisco offers a wide range of Grey XFP modules. Table 10 lists the details.

Table 10. GREY XFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-XC-10G-S1=	XFP – OC-192/STM-64/10GE – 1310 SR – SM LC	10-2012-02	ITU G694 I-64.1 GR253 SR-1 10GE BASE LR 1200-SM-LL-L	0 to +70
ONS-XC-10G-I2=	XFP – OC-192/STM-64/10GE – 1550 IR2 – SM LC	10-2193-02	ITU G694 S-64.2b GR253 IR-2	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-XC-10G-L2=	XFP – OC-192/STM-64 – 1550 LR2 – SM LC	10-2194-02	ITU G959.1 P1L1-2D2 GR253 LR-2	0 to +70

DWDM XFP Modules

Cisco offers a complete set of DWDM XFP modules. Table 11 lists the details.

Table 11. DWDM XFP Modules

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-XC-10G-30.3=	OC-192/STM-64/10GE, XFP, 1530.33, 100 GHz, LC	10-2347-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-31.1=	OC-192/STM-64/10GE, XFP, 1531.12, 100 GHz, LC	10-2346-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-31.9=	OC-192/STM-64/10GE, XFP, 1531.90, 100 GHz, LC	10-2344-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-32.6=	OC-192/STM-64/10GE, XFP, 1532.68, 100 GHz, LC	10-2345-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-33.4=	OC-192/STM-64/10GE, XFP, 1533.47, 100 GHz, LC	10-2343-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-34.2=	OC-192/STM-64/10GE, XFP, 1534.25, 100 GHz, LC	10-2342-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-35.0=	OC-192/STM-64/10GE, XFP, 1535.04, 100 GHz, LC	10-2341-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-35.8=	OC-192/STM-64/10GE, XFP, 1535.82, 100 GHz, LC	10-2340-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-36.6=	OC-192/STM-64/10GE, XFP, 1530.33, 100 GHz, LC	10-2347-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-37.4=	OC-192/STM-64/10GE, XFP, 1531.12, 100 GHz, LC	10-2346-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-38.1=	OC-192/STM-64/10GE, XFP, 1531.90, 100 GHz, LC	10-2344-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-38.9=	OC-192/STM-64/10GE, XFP, 1532.68, 100 GHz, LC	10-2345-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-39.7=	OC-192/STM-64/10GE, XFP, 1533.47, 100 GHz, LC	10-2343-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-40.5=	OC-192/STM-64/10GE, XFP, 1534.25, 100 GHz, LC	10-2342-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-41.3=	OC-192/STM-64/10GE, XFP, 1535.04, 100 GHz, LC	10-2341-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-42.1=	OC-192/STM-64/10GE, XFP, 1535.82, 100 GHz, LC	10-2340-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-42.9=	OC-192/STM-64/10GE, XFP, 1536.61, 100 GHz, LC	10-2339-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-43.7=	OC-192/STM-64/10GE, XFP, 1537.40, 100 GHz, LC	10-2338-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-44.5=	OC-192/STM-64/10GE, XFP, 1538.19, 100 GHz, LC	10-2337-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-45.3=	OC-192/STM-64/10GE, XFP, 1538.98, 100 GHz, LC	10-2336-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-46.1=	OC-192/STM-64/10GE, XFP, 1539.77, 100 GHz, LC	10-2335-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-46.9=	OC-192/STM-64/10GE, XFP, 1540.56, 100 GHz, LC	10-2348-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-47.7=	OC-192/STM-64/10GE, XFP, 1541.35, 100 GHz, LC	10-2334-01	ITU G694, GR2918	0 to +70

Product ID	Product Description	Part Number	Applicable Standard	Temperature Range (°C)
ONS-XC-10G-48.5=	OC-192/STM-64/10GE, XFP, 1542.14, 100 GHz, LC	10-2333-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-49.3=	OC-192/STM-64/10GE, XFP, 1542.94, 100 GHz, LC	10-2332-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-50.1=	OC-192/STM-64/10GE, XFP, 1543.73, 100 GHz, LC	10-2331-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-50.9=	OC-192/STM-64/10GE, XFP, 1544.53, 100 GHz, LC	10-2330-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-51.7=	OC-192/STM-64/10GE, XFP, 1545.32, 100 GHz, LC	10-2329-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-52.5=	OC-192/STM-64/10GE, XFP, 1546.12, 100 GHz, LC	10-2328-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-53.3=	OC-192/STM-64/10GE, XFP, 1546.92, 100 GHz, LC	10-2327-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-54.1=	OC-192/STM-64/10GE, XFP, 1547.72, 100 GHz, LC	10-2326-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-54.9=	OC-192/STM-64/10GE, XFP, 1548.51, 100 GHz, LC	10-2325-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-55.7=	OC-192/STM-64/10GE, XFP, 1549.32, 100 GHz, LC	10-2324-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-56.5=	OC-192/STM-64/10GE, XFP, 1550.12, 100 GHz, LC	10-2323-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-57.3=	OC-192/STM-64/10GE, XFP, 1550.92, 100 GHz, LC	10-2322-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-58.1=	OC-192/STM-64/10GE, XFP, 1551.72, 100 GHz, LC	10-2321-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-58.9=	OC-192/STM-64/10GE, XFP, 1552.52, 100 GHz, LC	10-2320-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-59.7=	OC-192/STM-64/10GE, XFP, 1553.33, 100 GHz, LC	10-2319-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-60.6=	OC-192/STM-64/10GE, XFP, 1554.13, 100 GHz, LC	10-2318-01	ITU G694, GR2918	0 to +70
ONS-XC-10G-61.4=	OC-192/STM-64/10GE, XFP, 1554.94, 100 GHz, LC	10-2317-01	ITU G694, GR2918	0 to +70

SFP Technical Details

SONET/SDH SFP Modules

The Cisco SFP modules are compatible with SONET/SDH standards, and support the digital diagnostic functions specified in the SFF-8742 MSA.

Tables 12 lists the optical parameters for the Cisco ONS SONET/SDH SFP modules.

Table 12. SONET/SDH SFP Modules: Optical Specifications

Product ID	Operating Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)	Maximum Dispersion (ps/nm)
15454-SFP3-1-IR= ONS-SI-155-I1=	1261–1360	–15 to –8	–28 to –8	96 (at 155.52 Mbps)
ONS-SI-155-L1=	1263–1360	–5 to 0	–34 to –10	NA
ONS-SI-155-L2=	1480–1580	–5 to 0	–34 to –10	NA
ONS-SI-155-SR-MM=	1270–1380	–20 to –14	–30 to –14	NA
ONS-SI-622-SR-MM=	1270–1380	–20 to –14 (50 µm) –24 to –14 (62.5 µm)	–26 to –14	NA

Product ID	Operating Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)	Maximum Dispersion (ps/nm)
15454-SFP12-4-IR= ONS-SI-622-I1=	1293–1334	–15 to –8	–28 to –8	46 (at 622.08 Mbps)
ONS-SI-622-L1=	1280–1335	–3 to +2	–28 to –8	NA
ONS-SI-622-L2=	1480–1580	–3 to +2	–28 to –8	NA
ONS-SE-2G-S1= ONS-SI-2G-S1=	1266–1360	–10 to –3	–18 to –3	12
ONS-SI-2G-I1= 15454-SFP-OC48-IR=	1260–1360	–5 to 0	–18 to 0	NA
ONS-SI-2G-L1=	1280–1335	–3 to +2	–27 to –9	NA
ONS-SE-2G-L2= ONS-SI-2G-L2=	1500–1580	–3 to +2	–28 to –9	1200–1600 ³

3: The indicated dispersion range corresponds to the approximate worst-case dispersion for 80 km G.652/G.654 fiber over the wavelength range 1500–1580 nm.

GBIC and Data SFP Modules

The GBIC and data SFP modules for the Cisco ONS Family are compatible with the IEEE 802.3, Single-Byte Command Code Sets CONNection architecture (SBCON) Rev2.3 [ESCON], ANSI INCITS 352-2002 Information technology – Fibre Channel – Physical Interfaces (FC-PI) Rev. 13 [1xFC and 2xFC], and support the digital diagnostic functions specified in the SFF-8742 MSA.

Tables 13 to 15 list the optical parameters for the GBIC and data SFP modules for the Cisco ONS Family.

Table 13. Ethernet Pluggable Modules: Optical Specifications

Product ID	Operating Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)	Maximum Dispersion (ps/nm)
ONS-SE-100-LX10=	1260–1360	–15 to –8	–28 to –8	NA
ONS-SE-100-FX=	1270–1380	–20 to –14 ⁴	–31 to –14	NA
ONS-SE-100-BX10U=	1260–1360 (TX) 1480–1580 (RX)	–14 to –8	–28.2 to –7	NA
ONS-SE-100-BX10D=	1480–1580 (TX) 1260–1360 (RX)	–14 to –8	–28.2 to –7	NA
15327-SFP-LC-SX= 15454-SFP-LC-SX= ONS-SC-GE-SX= ONS-SI-GE-SX= 15454-SFP-GEFC-SX= ONS-SE-G2F-SX= ONS-GC-GE-SX=	770–860	–9.5 to 0	–17 to 0 ⁵	NA
15327-SFP-LC-LX= 15454-SFP-LC-LX/LH= 15454-SFP-GE+-LX= ONS-SC-GE-LX= ONS-SI-GE-LX= ONS-SE-G2F-LX= ONS-GC-GE-LX=	1270–1355	–9.5 to –3	–19 to –3 ⁶	NA
ONS-GC-GE-ZX= ONS-SI-GE-ZX= ONS-SE-GE-ZX=	1500–1580	0 to +5	–23 to –3	1200–1600 ⁷

4: 62.5/125 μ m, NA = 0.275 fiber

5: Minimum Stressed Sensitivity (10^{-12}): –12.5(62.5 μ m) and –13.5(50 μ m) dBm

6: Minimum Stressed Sensitivity (10^{-12}): –14.4 dBm

7: The indicated dispersion range corresponds to the approximate worst-case dispersion for 80 km G.652/G.654 fiber over the wavelength range 1500–1580 nm.

Table 14. ESCON SFP Modules: Optical Specifications

Product ID	Operating Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)	Maximum Dispersion (ps/nm)
15454-SFP-200= ONS-SE-200-MM=	1280–1380	–20.5 to –15	–14 to –29 ⁸	NA

8: Based on any valid 8B/10B code pattern measured at, or extrapolated to, 10E-15 BER measured at center of eye.

Table 15. Fibre Channel/FICON Pluggable Modules: Optical Specifications

Product ID	Operating Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Sensitivity (dBm)	Operating Distance (m)
1G FC/FICON (1062.5 Kbps)				
15454-SFP-GEFC-SX= ONS-SE-G2F-SX=	770–860	–10 to –3.5	–22	0.5 to 500m (50/125 µm fiber) 0.5 to 300m (62.5/125 µm fiber)
ONS-GX-2FC-MMI=	770–860	–10 to –2.5	–22	0.5 to 500m (50/125 µm fiber) 0.5 to 300m (62.5/125 µm fiber)
15454-SFP-GE+-LX= ONS-SE-G2F-LX=	1270–1360	–10 to –3.5	–22	2 to 10,000
ONS-GX-2FC-SML=	1270–1355	–9 to –3	–23.5	2 to 10,000
2G FC/FICON (2125 Kbps)				
15454-SFP-GEFC-SX= ONS-SE-G2F-SX=	830–860	–10 to –3.5	–20	0.5 to 300
ONS-GX-2FC-MMI=	820–860	–9.5 to –5	–15	0.5 to 300
15454-SFP-GE+-LX= ONS-SE-G2F-LX=	1270–1360	–10 to –3.5	–21	2 to 10,000
ONS-GX-2FC-SML=	1270–1355	–9 to –3	–23.5	2 to 10,000
4G FC/FICON (4250 Kbps)				
ONS-SE-4G-MM=	830–860	–9 to –3.5	–15	0 to 70 (50/125 µm fiber) 0 to 150 (62.5/125 µm fiber)
ONS-SE-4G-SM=	1270–1355	–8.4 to –3	29 µW OMA ⁹	2 to 10,000

9: Specified OMA at 4.25 Gbps is equivalent to an average power of -17.3 dBm at an ER of 9 dB.

Multirate SFP Modules

Table 16 shows the optical parameters of the multirate SFP module for the Cisco ONS 15600 Series platform.

Table 16. Multirate SFP Module: Optical Parameters

Product ID	Operating Wavelength Range (nm)	Optical Transmit Power (dBm)	Receive Sensitivity (dBm)
ONS-SE-Z1=	1270–1360 (Tx) 1270–1600 (Rx)	–5 to 0	–18 (OC-48/STM-16) –22 (GE) –23 (OC-12/STM-4) –23 (OC-3/STM-1)

CWDM and DWDM GBICs

The Cisco ONS 15454 GBICs support both CWDM and DWDM. Two different models are available (see Tables 17 and 18).

Table 17. CWDM GBIC: Optical Specifications

Product ID	Transmit Power Range (dBm)	Receiver Wavelength Range (nm)	Receiver Power Range (dBm)	Dispersion Penalty (dB)
15454-GBIC-xxxx=	+1 to +5	1450–1620	–29 to –7	2 (at 60 km) 3 (at 100 km)

Note: "xxxx" ranges from 1470 to 1610.

Table 18. DWDM GBIC: Optical Specifications

Product ID	Receiver Wavelength Range (nm)	Transmitter Stability (pm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)	Dispersion Penalty (dB)
15454-GBIC-xx.x=	1450–1620	–100 to +100 (100GHz spacing)	–2 to +3	–28 to –7 (BER 10^{-12})	2 (at 60 km) 3 (at 100 km)

Note: "xx.x" ranges from 30.3 to 60.6.

CWDM and DWDM SFP Modules

Cisco is offering a full set of CWDM SFP modules for 155 Mbps, 622 Mbps, and DWDM SFPs for 2.5-Gbps applications. Tables 19 to 21 list the optical parameters.

Table 19. CWDM SFP Modules: Optical Specifications

Product ID	Receiver Wavelength Range (nm)	Spectral Width (nm)	Transmit Power Range (dBm)	Receiver Power Range (dBm)
ONS-SE-155-xxxx=	1460–1620	1	0 to +5	–34 to –3 (BER 10^{-10})
ONS-SE-622-xxxx=	1460–1620	1	0 to +5	–28 to –3 (BER 10^{-10})
ONS-SC-Z3-xxxx=	1460–1620	1	0 to +4	–28 to –9 (BER 10^{-10})

Note: "xxxx" ranges from 1470 to 1610.

Table 20. DWDM SFP Module: Optical Specifications

Product ID	Receiver Wavelength Range (nm)	Transmitter Stability (pm)	Spectral Width (pm)	Transmit Power Range (dBm)
ONS-SC-2G-xx.x=	1260–1620 ¹⁰	–100 to +100 (100GHz spacing)	200	0 to +4

Note: "xx.x" ranges from 30.3 to 60.6.

10: Receiver sensitivity specified over 1528-1561 nm only, with 2dB degradation permitted outside of this range.

Table 21. DWDM SFP Modules: Optical Performance

Optical Performance			
Power-Limited Performances			
Input power range	dBm	–9 to –28	At BER=10e-12 with SONET framed PRBS23 at OSNR of 21dB, 0.1nm BW
Dispersion tolerance	ps/nm	–800 to +2400	Power Penalty=3dB, OSNR=21dB at 0.1nmBW (Noise Penalty=0dB)
Noise-Limited Performances			
Input power range	dBm	–9 to –22	At BER=10e-12 with SONET framed PRBS23 at OSNR of 16dB at 0.1nm bandwidth
Dispersion tolerance	ps/nm	–800 to +2400	Noise Penalty=3dB, OSNR=19dB at 0.1nmBW (Power Penalty=0dB)

Grey XFP Modules

Cisco is offering a full set of Grey XFP modules for 10-Gbps applications. Table 22 lists the optical parameters.

Table 22. Grey XFP Modules: Optical Specifications

Product ID	Transmitter Wavelength Range (nm)	Transmit Power Range (dBm)	Receiver Wavelength range (nm)	CD Robustness (ps)	Receiver Power Range (dBm)
ONS-XC-10G-S1=	1260–1335	–6 to –1 ¹¹ –8.2 to +0.5 ¹²	1260–1565	6.6	–11 to –1 ¹¹ –14.4 to +0.5 ^{12,13}
ONS-XC-10G-I2=	1530–1565	–1 to +2	1260–1565	800	–14 to +2
ONS-XC-10G-L2=	1530–1565	0 to +4	1260–1565	1600	–24 to –7

11: SONET/SDH application

12: 10GE/10G Fibre Channel application

13: Stressed receiver sensitivity (maximum) in OMA is -10.3 dBm

DWDM XFP Modules

Cisco is offering a full set of DWDM XFP modules for 10-Gbps applications. Table 23 lists optical parameters.

Table 23. DWDM XFP Modules: Optical Specifications

Product ID	Receiver Wavelength Range (nm)	Transmitter Stability (pm)	Spectral Width (pm)	Transmit Power Range (dBm)
ONS-XC-10G-xx.x=	1260–1607 ¹¹	–100 to +100 (100GHz spacing)	200	–1 to +3

Note: "xx.x" ranges from 30.3 to 61.4.

Table 24. DWDM XFP Modules: Optical Performance

Optical Performance			
Short Wavelength Performances			
Input power range	dBm	–7 to –20	At BER=10e-12 (at 1310 nm ± 20nm) applicable at 9.9G, 10.3G only
Long Wavelength Performances C Band NO-FEC Applications Power-Limited			
Input power range	dBm	–7 to –23	At BER=10e-12 applicable at 9.9G, 10.3G only 23dB OSNR (0.5nm RBW)
Input power range		–7 to –20	At BER=10e-12 (–500 to +1600 ps/nm) applicable at 9.9G, 10.3G only – 23dB OSNR (0.5nm RBW)
Long Wavelength Performances C Band NO-FEC Applications Noise-Limited			
Input power range	dBm	–7 to –18	At BER=10e-12 applicable at 9.9G, 10.3G only 17dB OSNR (0.5nm RBW)
Input power range	dBm	–7 to –18	At BER=10e-12 (–500 to +1600 ps/nm) applicable at 9.9G, 10.3G only – 20dB OSNR (0.5nm RBW)
Long Wavelength Performances C Band FEC Applications Noise-Limited			
Input power range	dBm	–7 to –18	At BER PREFEC <10e-5 applicable at 10.7G, 11.1G only -- 11dB OSNR (0.5nm RBW)
Input power range	dBm	–7 to –18	At BER PREFEC <10e-5 (–500 to +1100 ps/nm) applicable at 10.7G, 11.1G only – 12dB OSNR (0.5nm RBW)
Long Wavelength Performances C Band E-FEC Applications Power-Limited			
Input power range	dBm	–7 to –27	At BER PREFEC <7*10e-4 applicable at 10.7G, 11.1G only – 23dB OSNR
Input power range	dBm	–7 to –24	At BER PREFEC <7*10e-4 (–500 to +1300 ps/nm) applicable at 10.7G, 11.1G only – 23dB OSNR (0.5nm RBW)

Optical Performance			
Long Wavelength Performances C Band E-FEC Applications Noise-Limited			
Input power range	dBm	–7 to –18	At BER PREFEC <7*10e-4 applicable at 10.7G, 11.1G only – 8dB OSNR (0.5nm RBW)
Input power range	dBm	–7 to –18	At BER PREFEC <7*10e-4 (–500 to +1100 ps/nm) applicable at 10.7G, 11.1G only – 9dB OSNR (0.5nm RBW)

Electrical SFP Modules

Cisco is offering an STM-1E and an RJ-45 copper SFP module. Table 25 lists the main characteristics.

Table 25. Electrical SFP Module Specifications

Product ID	Bit Rate	Connector	Typical Distance
ONS-SE-ZE-EL=	10/100/1000Mbps	RJ-45	100m
ONS-SC-155-EL=	155Mbps	Standard Coaxial Connector 75Ω	100m

Compatibility Matrix

Tables 26 through 30 indicate which SFP modules are available on different Cisco ONS Family platforms and boards.

Table 26. Cisco ONS 15454 MSPP

Product ID	Cisco ONS 15454 MSPP Boards												
	E1000-2-G	FC_MR-4	G1K-4	CE1000-4	ML1000-2	ML100-X-8	10G-SR1	10G-XR	MRC-12	MRC-4	MRC-12-2.5G	ML-MR-10	CE-MR-10
ONS-GC-GE-LX=	X		X	X									
ONS-GC-GE-SX=	X		X	X									
ONS-GC-GE-ZX=			X	X									
15454-GBIC-xx.x= ¹⁴			X	X									
15454-GBIC-xxxx= ¹⁵			X	X									
ONS-GX-2FC-MMI=		X											
ONS-GX-2FC-SML=		X											
ONS-SE-100-LX10=						X							
ONS-SI-100-LX10=												X	X
ONS-SE-100-FX=						X							
ONS-SI-100-FX=												X	X
ONS-SE-100-BX10D=												X	X
ONS-SE-100-BX10U=												X	X
15454-SFP-LC-SX=					X								
15454-SFP-LC-LX/LH=					X								
ONS-SC-GE-SX=	X				X								
ONS-SI-GE-SX=												X	X
ONS-SC-GE-LX=	X				X								
ONS-SI-GE-LX=												X	X
ONS-SI-GE-ZX=												X	X
ONS-SE-ZE-EL=												X	X
ONS-SI-155-SR-MM=									X	X	X		

	Cisco ONS 15454 MSPP Boards											
ONS-SI-155-I1=									X	X	X	
ONS-SI-155-L1=									X	X	X	
ONS-SI-155-L2=									X	X	X	
ONS-SC-155-EL= ¹⁶									X		X	
ONS-SI-622-SR-MM=									X	X	X	
ONS-SI-622-I1=									X	X	X	
ONS-SI-622-L1=									X	X	X	
ONS-SI-622-L2=									X	X	X	
ONS-SI-2G-S1									X	X	X	
ONS-SI-2G-I1=									X	X	X	
ONS-SI-2G-L1=									X	X	X	
ONS-SI-2G-L2=									X	X	X	
ONS-SE-Z1=									X	X	X	
ONS-SE-155-xxx ¹⁷									X	X	X	
ONS-SE-622-xxx ¹⁸									X	X	X	
ONS-SC-2G-xx.x= ¹⁹									X	X	X	
ONS-SC-Z3-xxx= ²⁰									X	X	X	
ONS-XC-10G-S1=							X	X				
ONS-XC-10G-I2=								X				
ONS-XC-10G-L2=								X				
ONS-XC-10G-xx.x= ²¹								X				

14: For DWDM GBIC, "xx.x" ranges from 30.3 to 60.6

15: For CWDM GBIC, "xxx" ranges from 1470 to 1610

16: Valid only for ETSI/SDH platform

17: For CWDM 155-Mbps SFP modules, "xxx" ranges from 1470 to 1610

18: For CWDM 622-Mbps SFP modules, "xxx" ranges from 1470 to 1610

19: For DWDM SFP modules, "xx.x" ranges from 30.3 to 60.6

20: For CWDM SFP modules, "xxx" ranges from 1470 to 1610

21: For DWDM XFP modules, "xx.x" ranges from 30.3 to 61.4

Table 27. Cisco ONS 15454 MSTP

Product ID	Cisco ONS 15454 MSTP Boards								
	100M-2.5G MR-TXP	2.5G MR DataMux	4x2.5G FEC MXP	4x2.5G EFEC TXP	10G EFEC TXP	10G MR DataMux	ADM-10G	GE-XP	10GE-XP
15454-SFP3-1-IR=	X								
ONS-SI-155-SR-MM=	X								
ONS-SI-155-L2=							X		
15454-SFP12-4-IR=	X								
ONS-SI-622-I1=							X		
15454-SFP-OC48-IR=	X		X	X					
ONS-SE-2G-S1=	X		X	X			X		
ONS-SE-2G-L2=	X			X			X		
ONS-SI-2G-S1							X		
ONS-SI-2G-I1=							X		
ONS-SI-2G-L2=							X		
ONS-SE-Z1=							X		

	Cisco ONS 15454 MSTP Boards								
ONS-SE-ZE-EL=						X		X	
15454-SFP-GE+-LX=	X	X				X			
15454-SFP-GEFC-SX=	X	X				X			
ONS-SE-G2F-SX=	X	X				X	X	X	
ONS-SE-G2F-LX=	X	X				X	X	X	
ONS-SE-GE-ZX=	X	X							
ONS-SI-GE-ZX=						X ²²	X	X	
15454-SFP-200=	X								
ONS-SE-200-MM=	X	X							
ONS-SE-4G-MM=						X			
ONS-SE-4G-SM=						X			
ONS-SC-2G-xx.x= ²⁴	X			X			X	X	
ONS-SC-Z3-xxx= ²⁵	X	X		X			X	X	
ONS-XC-10G-S1=					X		X	X	X
ONS-XC-10G-I2= ²⁶					X			X	X
ONS-XC-10G-L2= ²³					X ²⁴				
ONS-XC-10G-xx.x= ²⁷							X	X	X

22: Supported in software release 7.0.x but not in 8.0. Supported in Release 8.5.

23: ONS-XC-10G-L2. 10G TXP, when equipped with LR2 XFP, needs to be placed on high-speed slot for power dissipation constraint if using FTA-3 or FTA-48V. If CC-FTA is used, there is no restriction.

24: For DWDM SFP modules, "xx.x" ranges from 30.3 to 60.6. Supports GE, 1G FC, 2G FC, and OC-48, pending board rate support. Only P/N version 02 is qualified on the Cisco ONS 15454 MSTP. DWDM SFP modules will require mandatory CC-FTA use.

25: For CWDM SFP modules, "xxx" ranges from 1470 to 1610. Supports GE, 1G FC, 2G FC, and OC-48, pending board rate support. CWDM SFP modules will require mandatory CC-FTA use.

26: Only P/N version 02 is qualified on the Cisco ONS 15454 MSTP.

27: For DWDM XFP modules, "xx.x" ranges from 30.3 to 61.4.

Table 28. Cisco ONS 15600 MSSP

	Cisco ONS 15600 MSSP Boards	
Product ID	ASAP 4PIO CARD	ASAP 1PIO CARD
ONS-SI-155-L2=	X	
ONS-SI-622-L2=	X	
ONS-SE-Z1=	X	
ONS-SI-2G-S1=	X	
ONS-SI-2G-I1=		
ONS-SE-2G-L2=	X	
ONS-SC-2G-xx.x= ²⁸	X	
ONS-XC-10G-S1=		X
ONS-XC-10G-L2=		X

28: For DWDM SFP modules, "xx.x" ranges from 30.3 to 60.6.

Table 29. Cisco ONS 15300 Series Platforms

	Cisco ONS 15300 Series Boards			
Product ID	15305	15310-CL	15310-MA	15327
15327-SFP-LC-SX=				X
15327-SFP-LC-LX=				X
ONS-SC-GE-SX=	X			X
ONS-SC-GE-LX=	X			X

	Cisco ONS 15300 Series Boards			
15454-SFP-LC-SX=	X			
15454-SFP-LC-LX=	X			
ONS-SI-100-LX10=				
ONS-SI-100-FX=				
ONS-SE-100-BX10U=				
ONS-SE-100-BX10D=				
ONS-SI-GE-SX=				
ONS-SI-GE-LX=				
ONS-SI-GE-ZX=				
ONS-SI-155-I1=		X	X	
ONS-SI-155-L1=		X	X	
ONS-SI-155-L2=		X	X	
ONS-SI-622-I1=		X	X	
ONS-SI-622-L1=		X	X	
ONS-SI-622-L2=		X	X	
ONS-SI-2G-S1=			X	
ONS-SI-2G-I1=				
ONS-SI-2G-L1=			X	
ONS-SI-2G-L2=			X	
ONS-Se-Z1=			X	
ONS-SE-155-xxxx ²⁹			X	
ONS-SE-622-xxxx ³⁰			X	
ONS-SC-2G-xx.x= ³¹			X	

29: For CWDM 155 Mbps SFP modules, "xxxx" ranges from 1470 to 1610.

30: For CWDM 622 Mbps SFP modules, "xxxx" ranges from 1470 to 1610.

31: For DWDM SFP modules, "xx.x" ranges from 30.3 to 60.6.

Table 30. Cisco ONS 15500 Series Platforms

Product ID	Cisco ONS 15530 Boards			Cisco ONS 15540 Boards
	8-Port FC/GE	4-Port FC/FICON	8-Port Multiservice	TSP2
15454-SFP-GEFC-SX=	X	X	X	X
ONS-SE-G2F-SX=				

SFP Physical Details

Table 31. Tables below lists reliability data, power consumption and cable type to be used for each pluggable. SONET/SDH SFP Modules

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-SE-2G-S1=	3,039,499	1W	LC-LC
ONS-SE-2G-L2=	5,346,554	1W	LC-LC
ONS-SI-155-SR-MM=	4,878,048	1W	
ONS-SI-155-I1=	3,039,499	1W	LC-LC
ONS-SI-155-L1=	5,346,554	1W	LC-LC
ONS-SI-155-L2=	5,346,554	1W	LC-LC
ONS-SI-622-SR-MM=	4,761,904	1W	
ONS-SI-622-I1=	3,039,499	1W	LC-LC
ONS-SI-622-L1=	3,039,499	1W	LC-LC
ONS-SI-622-L2=	5,346,554	1W	LC-LC
ONS-SI-2G-S1	3,039,499	1W	LC-LC
ONS-SI-2G-I1=	9,970,080	1W	LC-LC
ONS-SI-2G-L1=	3,039,499	1W	LC-LC
ONS-SI-2G-L2=	5,346,554	1W	LC-LC

Table 32. Data SFP Modules

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-SE-100-LX10=	9,970,080	1W	LC-LC
ONS-SI-100-LX10=	9,970,080	1W	LC-LC
ONS-SE-100-FX=	9,970,080	1W	LC-LC
ONS-SI-100-FX=	9,970,080	1W	LC-LC
ONS-SC-GE-SX= ¹	7,919,921	1W	LC-LC
ONS-SI-GE-SX=	7,919,921	1W	LC-LC
ONS-SC-GE-LX= ²	9,970,080	1W	LC-LC
ONS-SI-GE-LX=	9,970,080	1W	LC-LC
ONS-SE-G2F-SX=	7,919,921	1W	LC-LC
ONS-SE-G2F-LX=	9,970,080	1W	LC-LC
ONS-SE-200-MM=	9,970,080	1W	LC-LC
ONS-SE-4G-MM=	7,919,921	1W	LC-LC
ONS-SE-4G-SM=	3,039,499	1W	LC-LC

Table 33. Electrical SFP Modules

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-SE-ZE-EL=	4,068,349	1W	RJ45 STP CAT5e and CTA6
ONS-SC-155-EL=	5,714,286	1W	75Ω DIN 1.0/2.3

Table 34. Multirate SFP Modules

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-SE-Z1=	3,039,499	1W	

Table 35. Grey GBICs

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-GC-GE-LX=	7,919,921	1.8	SC-PC SM
ONS-GC-GE-SX=	9,970,080	1.8	SC-PC MM
ONS-GC-GE-ZX=	5,346,554	1.8	SC-PC SM
ONS-GX-2FC-MMI=	7,919,921	1.8	SC-PC MM
ONS-GX-2FC-SML=	3,039,499	1.8	SC-PC SM

Table 36. GREY XFP Modules

Product ID	MTBF in hours	Power Consumption MAX (W)	Supported Cable Connection
ONS-XC-10G-S1=	3,039,506	2.5	LC-LC
ONS-XC-10G-I2=	3,279,693	3	LC-LC
ONS-XC-10G-L2=	2,711,429	3	LC-LC

DWDM Pluggables

Table 37. xWDM SFP Modules

Product ID	MTBF	Power Consumption MAX (W)	Supported Cable Connection
ONS-SC-2G-xx.x=	5,346,554	1	LC-LC
ONS-SC-Z3-xxxx=	2,070,393	1.1	LC-LC
ONS-SE-155-xxxx=	5,346,554	1	LC-LC
ONS-SE-622-xxxx=	5,346,554	1	LC-LC
ONS-XC-10G-xx.x=	2,711,000	3.5	LC-LC

Ordering Information

All the available pluggable interfaces are orderable from Cisco.com. Please check the Pricing Tool for further information:

<http://www.cisco.com/cgi-bin/front.x/pricing?Request=ShowCurrentPriceSrch>

Please select “ONS Pluggable Optics Series” as the Product Family.

Third-Party Equipment

The use of third-party equipment in the place of Cisco ONS SFP products is not recommended, for the following reasons:

- Cisco can guarantee service-level agreements (SLAs) only on parts that have undergone the Cisco Test Plan and Validation Process. Without comprehensive testing and validation, SFP products may display anomalous behavior that can impact host-board performance.

- Cisco SFP modules reserve specific EEPROM fields in order to store inventory data such as Product ID, Part Number, Serial Number, and CLEI CODE that are specific to Cisco SFP modules and are required for SLAs.
- The Cisco Technical Assistance Center (TAC) and Cisco Customer Advocacy can only support Cisco modules and boards for the Cisco ONS Family products

Lead Time

Please check the Lead-Time Tool to identify standard lead-time for various Cisco ONS Family products:

<http://www.cisco.com/cgi-bin/front.x/leadtimes.cgi>

A different approach is used for DWDM SFP modules. Based upon customer usage, Cisco has identified and selected particular high-usage wavelengths, and will maintain shorter lead-times on these items.

Short lead-time (4 weeks) DWDM SFP modules are from 1550.1 to 1560.6.

Unforecasted pluggable optics on different lambdas could lead to 16 weeks of delivery time.

End-of-Sale/End-of-Life Products

Table 31 lists the Cisco SFP modules that have reached end-of-life or end-of-sale, followed by their replacement products.

Table 38. End-of-Sale/End-of-Life SFP Modules

End-of-Life/End-of-Sale Product ID	Replacement Product ID
15327-SFP-LC-SX=	ONS-SC-GE-SX=
15327-SFP-LC-LX=	ONS-SC-GE-LX=
15454-SFP-LC-SX=	ONS-SC-GE-SX=
15454-SFP-LC-LX=	ONS-SC-GE-LX=
15454-SFP-GE+-LX=	ONS-SE-G2F-SX=
15454-SFP-GEFC-SX=	ONS-SE-G2F-SX=



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